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10/587,268	07/26/2006	Hiroaki Takaiwa	128865	8388

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LIU, MICHAEL	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/587,268	TAKAIWA ET AL.	
	Examiner	Art Unit	
	Michael Liu	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Receipt is acknowledged of the Amendment filed on 7/31/09. By this amendment, claims 1, 24, 25, 27, and 28 have been amended. Accordingly, claims 1-51 are pending in the instant application.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/31/09 has been entered.

Claim Objections

3. Claims 1 and 30 are objected to because of the following informalities:

a. On line 4 of claim 1, the term “a liquid” already has antecedent basis.

b. In claim 30, "at least two of the plurality of beams" lacks antecedent basis. Moreover, "the vicinity of edge portions" should be changed to --the vicinity of the edge portion--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The traversal of the claim rejection under 35 USC § 112 is persuasive, and as a result, the rejection of claim 1 is withdrawn.

Claim Rejections - 35 USC § 102

5. Despite the claim amendments, the rejection under Mulkens is maintained. However, the rejection under Takahashi is withdrawn. Upon further review, new rejections are applied under Iriguchi, Kroupenkine, and Streefkerk.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 4-14, 19, 22 and 48 are rejected under 35 U.S.C. 102(e) as being anticipated by Mulkens et al (US 2005/0132914).

Note: With respect to claim 1, the preamble reciting intended use, e.g., "that exposes a substrate by emitting exposure light onto the substrate through a projection optical system and a liquid," is not given patentable weight. In apparatus, article, and composition claims, intended use language must result in a structural difference to patentably distinguish over the prior art. See MPEP § 2111.02, 2112, & *In re Schreiber,* 44 USPQ2d 1429 (Fed Cir 1997).

Claim 1: Mulkens discloses an exposure apparatus [Fig 4] comprising:

a detection apparatus 22 that detects whether the liquid is present on an object WT [Par 0105: "As shown in Fig 4, a detector 22 detects the presence or absence of

immersion liquid present on the substrate W."] that is disposed lower than a front end of the projection optical system PL at a time when the exposure light [Par 0105: low intensity electromagnetic waves] is emitted onto the substrate W by the projection optical system [W located by PL].

Claim 2: the detection apparatus 22 has an emitting portion [Par 0105: emits EM waves] that emits detection light and a light receiving portion [detects EM waves].

Claim 4: the detection is performed while relatively moving the detection light and the object. [Fig 4: The detection light, which are EM waves, relatively moves with respect to the object WT while the detection is performed by detector 22. The EM waves clearly move relative to the substrate table WT to strike and reflect off the table.]

Claim 5: the object WT is movable [Par 0099: via second positioning device PW] with respect to the projection optical system PL.

Claim 6: the object includes at least one of the substrate, a substrate stage WT that is movable and holds the substrate W, and a member provided on the substrate stage.

Claim 7: a bending portion that bends an optical path of the detection light. [Fig 4: The immersion liquid present on the substrate W bends an optical path of the detection light, since it has a different refractive index than air.]

Claim 8: the detection light is emitted substantially parallel to a surface of the object WT. [Fig 2: The substrate table WT has multiple surfaces, which includes the vertical surface in the Z direction. This vertical surface of WT is parallel to the detection light.]

Claim 9: whether the liquid is present in an optical path of the detection light is determined based on a light receiving result of the light receiving portion. [Par 0105: "In this example, the detector 22 detects the presence of liquid on the substrate W by the reflection of low intensity electromagnetic waves."]

Claim 10: the detection light passes through an area away from the surface of the object WT by less than 5.5 mm. [Detection light reaches the surface of the substrate table WT; therefore, the detection light is less than 5.5 mm from the surface of WT.]

Claim 11: a position of the liquid on the object WT is obtained based on a light receiving result of the light receiving portion 22. [Par 0105: When the detector 22 detects the presence of immersion liquid on substrate table WT, the position of the liquid is determined.]

Claim 12: the emitting portion emits the detection light to a space [Fig 4: below detector 22] between the projection optical system PL and the object WT [Fig 4].

Claim 13: the emitting portion emits the detection light to a surface of the object WT [Fig 4 and Par 0105].

Claim 14: the light receiving portion receives light from the surface of the object, and the liquid on the surface of the object can be detected based on the light receiving result. [Par 0105: "In this example, the detector 22 detects the presence of liquid on the substrate W by the reflection of low intensity electromagnetic waves."]

Claim 19: the detection light includes a sheet light flux [EM waves have sheet light flux].

Claim 22: an exposure operation is controlled based on a detection result of the detection apparatus. [Par 0105: "Based on the measurement of detector 22, the controller 21 determines which one or more optical elements 9, 10, 11, 12 is/are necessary. The controller can determine which one or more of optical elements 9, 10, 11 and 12 can ensure that the projection beam PB is accurately focused on the upper substrate surface."]

Claim 48: A device manufacturing method comprising:

exposing a substrate W through the projection optical system PL of the exposure apparatus [Fig 4] according to Claim 1; and

processing the exposed substrate [Par 0072].

8. Claims 1-15, 19, 22-30, 35-37, 41, and 48-50 are rejected under 35 U.S.C. 102(e) as being anticipated by Iriguchi (2004/0103950).

Claim 1: Iriguchi discloses an exposure apparatus [Fig 1] that exposes a substrate 210 by emitting exposure light [from 260] onto the substrate through a projection optical system 202 and a liquid 204 [Par 0059], the exposure apparatus comprising:

a detection apparatus 240 that detects whether the liquid is present on an object 200 that is disposed lower than a front end 203 of the projection optical system at a time when the exposure light is emitted onto the substrate by the projection optical system.

Claim 2: the detection apparatus has an emitting portion 260 that emits detection light and a light receiving portion 246.

Claim 3: the detection light is emitted from said emitting portion to a plurality of positions MP11a, b [Fig 2], and at least one of a size and a shape of the liquid is obtained based on a light receiving result of the light receiving portion [Par 0056: size determined, as well as shape of liquid on 200].

Claim 4: the detection is performed while relatively moving the detection light [Par 0045: 260 moved relatively by 262] and the object.

Claim 5: the object 200 is movable with respect to the projection optical system 202 [Pars 0059; 0063: 200 moved to be mounted to 202].

Claim 6: the object includes at least one of the substrate, a substrate stage that is movable and holds the substrate, and a member 200 provided on the substrate stage 222 [Fig 1: 200 on top of 222].

Claim 7: a bending portion 202 that bends an optical path of the detection light.

Claim 8: the detection light [from 260] is emitted substantially parallel to a surface 201 of the object 200.

Claim 9: whether the liquid is present in an optical path of the detection light is determined based on a light receiving result of the light receiving portion [Par 0061].

Claim 10: the detection light passes through an area away from the surface 201 of the object 200 by 5.5 mm or less than 5.5 mm [Par 0059: detection beam reaches 201; therefore, less than 5.5 mm].

Claim 11: a position of the liquid on the object is obtained based on a light receiving result of the light receiving portion [Par 0056: at points MP11a, b].

Claim 12: the emitting portion 260 emits the detection light to a space between the projection optical system 202 and the object 200.

Claim 13: the emitting portion 260 emits the detection light to a surface 201 of the object 200.

Claim 14: the light receiving portion 246 receives light from the surface 201 of the object [Par 0059: reflected from 201], and the liquid on the surface of the object can be detected based on the light receiving result [Par 0061].

Claim 15: the surface of the object includes a recessed portion 312 formed on the object 200 [Fig 8].

Claim 19: the detection light includes a sheet light flux [Par 0044: inspection beam has sheet light flux].

Claim 22: an exposure operation is controlled based on a detection result of the detection apparatus [Par 0061: procedure advances to exposing process when no replenishment necessary].

Claim 23: a warning is issued if it is determined that a detection result of the detection apparatus is abnormal [Par 0060: issue alarm if boundary LA1 is reduced].

Claim 24: Iriguchi discloses an exposure apparatus [Fig 1] that exposes a substrate 210 by emitting exposure light [from 280] onto the substrate through a projection optical system 202 and a liquid 204, the exposure apparatus comprising:

a liquid supply system 230 having a supply port 238, which supplies the liquid such that the liquid covers only a portion of a surface of the substrate at a time when the exposure light is emitted onto the substrate; and

a detection apparatus 240 having a light receiving portion 246 provided in a space lower than the supply port 238 of the liquid supply system, wherein the detection apparatus detects a position of an edge portion MP11a, b [Fig 2] of an immersion area LA1 in a direction [vertical] perpendicular to an optical axis [Fig 1: light from 260 first is horizontal in 202] of the projection optical system, that is formed between the projection optical system and an object 200 disposed on an image plane side of the projection optical system, based on a light receiving result of the light receiving portion [Par 0061].

Claim 25: the detection apparatus includes an emitting portion 260 that emits detection light, and at least one of a size and a shape of the immersion area is obtained based on the light receiving result of the detection light [Par 0056: size determined, as well as shape of liquid on 200].

Claim 26: a detection by the detection apparatus 240 is performed in parallel with the exposure [by 260] of the substrate 210 [Par 0059].

Claim 27: the detection apparatus 240 includes an emitting portion 260 that emits detection light, and the detection light is emitted to the vicinity of the edge portion MP11a, b of the immersion area LA1 [Fig 2].

Claim 28: the detection apparatus 240 includes an emitting portion 260 that emits detection light, and the detection light is emitted to each of a plurality of positions in the vicinity of the edge portion MP11a, b of the immersion area LA1 [Fig 2].

Claim 29: optical paths of a plurality of beams of the detection light emitted to the vicinity of the edge portion MP11a, b are set in accordance with a target shape [Fig 2] of the immersion area LA1.

Claim 30: at least two of a plurality of beam [for MP11b] of the detection light are emitted to the vicinity of the edge portion on both sides of the immersion area LA1, respectively [Fig 2].

Claim 35: the detection apparatus includes an emitting portion 260 that emits detection light, and the detection light includes a sheet light flux [Par 0044: inspection beam has sheet light flux].

Claim 36: Iriguchi discloses an exposure apparatus [Fig 1] that exposes a substrate 210 by emitting exposure light [from 280] onto the substrate through a projection optical system 202 and a liquid 204, the exposure apparatus comprising:

a shape detection apparatus 240 that obtains a shape of the liquid on an object 200 which is movable on an image plane of the projection optical system [Par 0056: shape of liquid on 200 determined].

Claim 37: the detection apparatus has an emitting portion 260 that emits a plurality of detection light [Par 0061] arrayed in a vertical direction with respect to a surface 201 of the object, and a light receiving portion 246, wherein the detection apparatus obtains the shape of the liquid based on a light receiving result of the light receiving portion.

Claim 41: the object includes at least one of the substrate, a substrate stage that holds the substrate, and a member 200 provided on the substrate stage 222 [Fig 1: 200 on top of 222].

Claim 48: A device manufacturing method comprising:

exposing a substrate 210 through the projection optical system 202 of the exposure apparatus [Fig 1] according to Claim 1; and

processing the exposed substrate [inherent after exposure].

Claim 49: A device manufacturing method comprising:

exposing a substrate 210 through the projection optical system 202 of the exposure apparatus [Fig 1] according to Claim 24; and

processing the exposed substrate [inherent after exposure].

Claim 50: A device manufacturing method comprising:

exposing a substrate 210 through the projection optical system 202 of the exposure apparatus [Fig 1] according to Claim 36; and

processing the exposed substrate [inherent after exposure].

9. Claim 42 is rejected under 35 U.S.C. 102(b) as being anticipated by Kroupenkine et al (6,538,823).

Note: With respect to claim 42, the preamble reciting intended use, e.g., "that exposes a substrate by emitting exposure light onto the substrate through a projection optical system and a liquid," is not given patentable weight. In apparatus, article, and composition claims, intended use language must result in a structural difference to patentably distinguish over the prior art. See MPEP § 2111.02, 2112, & *In re Schreiber,* 44 USPQ2d 1429 (Fed Cir 1997).

Kroupenkine discloses an exposure apparatus [Fig 1A] comprising:

a detection apparatus [using 16] that detects a contact angle θ of the liquid 12 [Equations (2), (3)], on an upper surface of a substrate stage [not shown; inherent] that holds the substrate 14, with respect to the upper surface of the substrate stage.

10. Claims 1, 2, 13, 15-17, 24, and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Streefkerk et al (2006/0007419).

Claim 1: Streefkerk discloses an exposure apparatus [Fig 1] that exposes a substrate W by emitting exposure light PB onto the substrate through a projection optical system PL and a liquid 11 [Fig 5], the exposure apparatus comprising:

a detection apparatus [Fig 8] that detects whether the liquid d is present on an object WT that is disposed lower than a front end of the projection optical system at a time when the exposure light is emitted onto the substrate by the projection optical system [Par 0053: sensors for detecting residual liquid may operate in parallel with exposure].

Claim 2: the detection apparatus has an emitting portion 60 that emits detection light and a light receiving portion 61.

Claim 13: the emitting portion 60 emits the detection light to a surface of the object WT [Fig 8].

Claim 15: the surface of the object WT includes a recessed portion [where W is held] formed on the object [Fig 8].

Claim 16: the recessed portion is provided to a substrate stage WT that is movable and holds the substrate W, and a substrate holder [recessed portion that holds W] that holds the substrate is disposed in the recessed portion, and the detection

apparatus also detects whether liquid is present on the substrate holder at a time when the substrate is not held on the substrate holder [Par 0048: detection of liquid left on substrate table; inherent that substrate moved out].

Claim 17: the emission of the detection light to the substrate holder is performed before loading the [next] substrate on the substrate holder [Par 0048].

Claim 24: Streefkerk discloses an exposure apparatus [Fig 1] that exposes a substrate W by emitting exposure light PB onto the substrate through a projection optical system PL and a liquid 11 [Fig 5], the exposure apparatus comprising:

a liquid supply system having a supply port 13, which supplies the liquid such that the liquid covers only a portion of a surface of the substrate at a time when the exposure light is emitted onto the substrate; and

a detection apparatus [Fig 8] having a light receiving portion 61 provided in a space lower than the supply port 13 of the liquid supply system [Par 0053: sensors mounted on liquid supply system], wherein the detection apparatus detects a position of an edge portion of an immersion area d [Fig 8: detects edge portion of droplets d] in a direction X perpendicular to an optical axis Z of the projection optical system, that is formed between the projection optical system and an object WT disposed on an image plane side of the projection optical system, based on a light receiving result of the light receiving portion [Par 0051].

Claim 36: Streefkerk discloses an exposure apparatus [Fig 1] that exposes a substrate W by emitting exposure light PB onto the substrate through a projection optical system PL and a liquid 11 [Fig 5], the exposure apparatus comprising:

a shape detection apparatus 30 [Fig 6] that obtains a shape of the liquid [Par 0049: based on height measurements] on an object WT which is movable on an image plane of the projection optical system.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 18 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iriguchi in view of Murakami (2001/0055100).

Iriguchi discloses all limitations except for specifying the type of light used for the detection beam of light source 260.

However, Murakami teaches in Par 0022 detecting light being infrared.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to recognize that the detection beam of Iriguchi is infrared, as taught by Murakami, for the purpose of performing effective detection of the liquid.

13. Claims 20, 21, and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iriguchi.

Claims 20 and 31: Iriguchi discloses a liquid supply system 230 having a supply port 238; and

wherein an operation of the liquid supply system is controlled based on a detection result of the detection apparatus

However, Iriguchi does not disclose expressly a liquid recovery system.

At the time the invention was made, it would have been obvious to provide a liquid recovery system having a recovery port, as is conventional in immersion lithography, for the purpose of having the capability of removing the liquid after exposure is completed.

Claims 21 and 32: the supply of the liquid by the liquid supply system is stopped if it is determined that the detection result of the detection apparatus is abnormal

Claim 33: the supply of the liquid by the liquid supply system is stopped if the immersion area of the liquid formed between the projection optical system and the substrate has become equal to, or larger than a predetermined size [Par 0062: stop flow path pump as soon as liquid quantity is restored; liquid quantity is equal to predetermined size].

14. Claims 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iriguchi in view of Kroupenkine.

Iriguchi discloses all limitations except for obtaining a contact angle of the liquid.

However, Kroupenkine teaches a contact angle θ of the liquid with respect to the object 14 is obtained based on the obtained shape of the liquid [Fig 1A; Equations (2), (3)]. From this, an affinity of the liquid for the object and a height of the light can both be obtained.

At the time the invention was made, it would have been obvious to use the shape detection apparatus of Iriguchi to obtain the contact angle of the liquid with respect to

the object, as taught by Kroupenkine, for the purpose of determining the attraction between the liquid and the object, in order to achieve optimal immersion exposure.

15. Claims 42-47 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mulkens in view of Kroupenkine.

Claim 42: Mulkens discloses an exposure apparatus [Fig 1] that exposes a substrate W by emitting exposure light PB onto the substrate through a projection optical system PL and a liquid [Fig 5], the exposure apparatus comprising:

a detection apparatus 22 [Fig 4] that detects the liquid [Par 0105], on an upper surface of a substrate stage WT that holds the substrate, with respect to the upper surface of the substrate stage.

Mulkens does not disclose expressly detecting a contact angle of the liquid.

However, Kroupenkine teaches in Fig 1A light waves 16 being incident upon a droplet 12 from above. From this configuration, the contact angle θ can be determined using Equations (2), (3).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to determine the contact angle using the detector 22 of Mulkens, as taught by Kroupenkine, for the purpose of determining the attraction between the liquid and the object, in order to achieve optimal immersion exposure.

Claim 43: Mulkens as combined discloses the contact angle of the liquid with respect to the upper surface of the substrate stage is obtained periodically [Figs 4-8, 10: contact angle obtained during every detection by detector 22].

Claim 44: Mulkens as combined discloses the upper surface of the substrate stage WT includes a surface of a member 9-12 which is replaceably disposed on the substrate stage, and the member is replaced based on the detected contact angle [Par 0105: "Based on the measurement by detector 22, the controller 21 determines which one or more of optical elements 9, 10, 11, 12 is/are necessary."

Claim 45: Mulkens discloses the upper surface of the substrate stage WT includes a surface of the substrate W held by the substrate stage [Fig 4].

Claim 46: Mulkens discloses a liquid supply system having a supply port IN [Fig 2], that supplies the liquid; and

a liquid recovery system having a recovery port OUT, that recovers the liquid;

wherein an operation of at least one of the liquid supply system and the liquid recovery system is controlled based on the detected contact angle [Par 0106: liquid supply system supplies liquid based on detector].

Claim 47: Mulkens as combined teaches all limitations except for the detection light being infrared light.

However, Mulkens teaches detecting liquid using low intensity EM waves [Par 0105]. Since it is known that infrared light propagates at low intensity relative on the light spectrum, infrared light can be reasonably interpreted to be low intensity EM waves.

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to recognize that infrared light is equivalent to low intensity EM

waves and can be used as the detection light of Mulkens, for the purpose of accurately detecting the presence of immersion liquid to achieve quality exposure.

Claim 51: A device manufacturing method comprising:

exposing a substrate W through the projection optical system PL of the exposure apparatus [Fig 1] according to Claim 42; and

processing the exposed substrate [Par 0072].

Allowable Subject Matter

16. The indicated allowability of claims 3, 15-17, 28-33, 36-47, 50, and 51 are withdrawn in view of the newly discovered reference(s) to Iriguchi, Streefkerk, and Kroupenkine.

Response to Arguments

17. Applicant's arguments with respect to the claim 1 rejection under Mulkens have been fully considered but they are not persuasive. Applicant argues, “The Mulkens et al. ‘electromagnetic waves’ are not the exposure light emitted onto the substrate by the projection optical system” [P12L14-15]. The examiner respectfully disagrees. In Fig 4 of Mulkens, the substrate W is exposed to the electromagnetic waves emitted downwards from the detector 22. As a result, the EM waves can be considered exposure light since the substrate is exposed to the EM waves. Therefore, the exposure light of claim 1 can be reasonably interpreted to be the EM waves of Mulkens. Furthermore, adding the limitation "by the projection optical system" does not change the patentability of the claim. As currently claimed, the claim language is broad enough to be interpreted as the substrate is located by the projection optical system. Fig 4 of

Mulkens clearly shows the substrate W located by the projection optical system PL. As a result, Mulkens teaches the limitation "the substrate by the projection optical system." Therefore, Applicant's arguments are not persuasive.

18. Applicant's arguments with respect to the claim 24 rejection under Mulkens have been considered but are moot in view of the new ground(s) of rejection.

19. Applicant's arguments with respect to the claim 1 rejection under Takahashi have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Liu whose telephone number is 571-272-9019. The examiner can normally be reached on Monday through Friday 9 am - 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on 571-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Michael Liu/
Examiner, Art Unit 2851

Michael Liu
Examiner
Art Unit 2851

/HUNG HENRY NGUYEN/
Primary Examiner
Art Unit 2851